

## Claims

1. Stereocomplex hydrogel composition, comprising a mixture of a first and a second polymer, wherein each first and each second polymer have at least one hydrophilic region and at least two oligomeric degradable regions which are hydrolysable under physiological conditions and which comprise enantiomerically enriched chiral monomeric units, and wherein at least one of the degradable regions of the first polymer and at least one of the degradable regions of the second polymer have predominantly opposite chirality, and wherein at least some of the degradable regions present in the composition are characterised by the absence of free terminal hydroxyl groups.
2. Hydrogel composition according to claim 1, wherein at least one of the first and the second polymer is a graft polymer, of which the hydrophilic region is the backbone and the degradable regions are the side chains.
3. Hydrogel composition according to claim 2, wherein said graft polymer has an average degree of substitution (DS) between about 2 and about 15 %.
4. Hydrogel composition according to claim 2 or 3, wherein the side chains of said graft polymer have an average degree of polymerisation (DP) in the range of about 7 to 15.
5. Hydrogel composition according to any of claims 2 to 4, wherein the side chains of said graft polymer have a polydispersity of not more than about 1.5.
6. Hydrogel composition according to claim 1, wherein at least one of the first and the second polymer is a block polymer comprising three or more blocks, and wherein the degradable regions form at least the terminal blocks of said block polymer.
7. Hydrogel composition according to claim 6, wherein at least one of the first and the second polymer is an ABA block polymer, wherein the hydrophilic region forms the central B block.
8. Hydrogel composition according to any of the preceding claims, wherein the degradable region is attached to the hydrophilic region via a linking group

which is preferably selected from the group consisting of ester groups, amide groups, and urethane groups.

9. Hydrogel composition according to claim 8, wherein the linking group is hydrolytically more stable than the degradable region.

5 10. Hydrogel composition according to any of the preceding claims, wherein the hydrophilic region of at least one of the first and the second polymer is derived from a member of the group consisting of polysaccharides including dextran, starch, cellulose and cellulose derivates, alginates, pectin, chitosan; polypeptides including albumin, lysozym, poly(amino acids), poly(lysine) and related copolymers, 10 poly(glutamic acid) and related copolymers; poly(acrylates)/(acrylamides) including poly(alkyl acrylates)/(alkyl acrylamides) such as poly(methacrylate), poly(hydroxyethyl methacrylate), poly(hydroxypropyl methacrylate), poly(hydroxyethyl methacrylamide), poly(hydroxypropyl methacrylamide); poly(vinylalcohol), poly(ethylene glycol), water soluble polyphosphazenes, and 15 mixtures thereof.

11. Hydrogel composition according to any of the preceding claims, wherein the degradable regions of at least one of the first and the second polymer are predominantly composed of enantiomerically enriched (L)- and/or (D)-lactate units.

12. Hydrogel composition according to claim 11, wherein at least some of the 20 degradable regions predominantly composed of enantiomerically enriched (L)- and/or (D)-lactate units further comprise monomeric units selected from glycolate,  $\epsilon$ -caprolactone, and propiolactone units.

13. Hydrogel composition according to any of the preceding claims, wherein essentially all degradable regions of the first polymer are of opposite chirality to 25 essentially all degradable regions of the second polymer.

14. Hydrogel composition according to any of the preceding claims, wherein at least some of the degradable regions of the first or second polymer bear terminal acyl groups.

15. Hydrogel composition according to any of the preceding claims, being 30 shaped as a plurality of microparticles, as a sheet, or a single implantable unit.

16. Hydrogel composition according to any of the preceding claims, further comprising a pharmaceutically active compound.

17. Hydrogel composition according to claim 16, wherein the pharmaceutically active compound is a protein.

5        18. Method for preparing a hydrogel composition according to any of claims 1 to 17, comprising a step of combining the first polymer and the second polymer in the presence of water and, optionally, other excipients.

10        19. The method of claim 18, wherein the step of combining the first and the second polymer is conducted in the presence of a pharmaceutically active compound.

20. Kit for the preparation of a hydrogel composition according to any of claims 1 to 17, comprising a first component comprising the first polymer and a second component comprising the second polymer.

15        21. Kit for the preparation of a hydrogel composition according to any of claims 1 to 17, comprising a first component comprising the first and the second polymer, and a second component comprising water.

22. The kit of claim 21, wherein said first component comprises a xerogel capable of forming a stereocomplex hydrogel upon hydration.

20        23. The kit of any of claims 20 to 22, further comprising a pharmaceutically active compound.

24. Use of a hydrogel composition according to any of claims 1 to 17, or of a kit according to any of claims 20 to 23 in the manufacture of injectable and/or implantable pharmaceutical formulations, in wound dressings, or in tissue engineering.

25